

Anticipation Guide: Ideas About Experimental Design

Before starting the activity, mark whether you agree (+) or disagree (—) with each statement below.

After completing the activity, mark whether you agree (+) or disagree (—) with each statement below. Under each statement, explain how the activity gave evidence to support or change your ideas.

Before After

- | | | | |
|-------|-------|-----------|--|
| _____ | _____ | 1. | All scientists solve problems the same way. |
| _____ | _____ | 2. | There is only one scientific method. |
| _____ | _____ | 3. | When humans are the subject of a scientific study, it does not matter how many people are in the study. |
| _____ | _____ | 4. | Scientific studies involving humans are very different from other types of scientific studies. |
| _____ | _____ | 5. | Clinical trials of experimental treatments or medicines should only use people who know they are involved in a scientific study. |
| _____ | _____ | 6. | There must be a control group in a clinical trial. |
| _____ | _____ | 7. | People participating in a clinical trial do not usually know there are risks involved. |
| _____ | _____ | 8. | A placebo is a medicine that is being tested in a clinical trial. |
| _____ | _____ | 9. | Studying people is complex because there are ethical issues involved in experimenting on humans. |

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(continued)

- _____ 10. A well-designed experiment should have a hypothesis.
- _____ 11. A well-designed scientific experiment should test only two or three variables.
- _____ 12. Even carefully designed experiments on humans may have uncontrolled variables.
- _____ 13. A hypothesis can be revised based on new evidence.
- _____ 14. Quantitative data (data involving numbers) is always more reliable than other types of data.
- _____ 15. If a medicine works well for a few people, it usually works for everyone.
- _____ 16. One trial of a medicine is usually enough to find out if it is safe.
- _____ 17. When studying people scientists must design investigations that account for human variation.
- _____ 18. A well-designed experiment should produce results that are reproducible in later experiments.
- _____ 19. Controlling variables in an experiment means keeping these variables the same.